Listing of Claims

1. (Currently amended) A method of identifying oscillation in a signal due to feedback, the method comprising ~~the steps of~~:

converting the signal at each of a series of successive time windows into the frequency domain;

calculating for each of a plurality of frequency bands the change in signal phase from a time window to a subsequent time window; and

comparing, for some or all of said frequency bands, the results of the calculation ~~step~~ to one or more defined criteria to provide a measure of whether oscillation due to feedback is present in the signal.

2. (Currently amended) The method of claim 1, ~~including the step of~~ further comprising calculating, for some or all of said frequency bands, the change in signal amplitude from a time window to a subsequent time window, and comparing the result of the further calculation ~~step~~ to one or more further defined criteria, to provide a further measure as to whether oscillation due to feedback is present in the signal.

3. (Currently amended) The method of ~~any preceding~~ claim 1, in which the ~~step of~~ signal conversion into the frequency domain is carried out by way of a Fast Fourier Transform technique.

4. (Currently amended) The method of ~~any preceding~~ claim 1, in which the number of frequency bands is around 64.

5. (Currently amended) The method of ~~any preceding~~ claim 1, in which said successive time windows are in the range of 1 to 100 ms.

6. (Currently amended) The method of ~~any preceding~~ claim 1, in which for each of said plurality of frequency bands, for each time window the signal phase from one or more previous time windows is compared with that from the current window to calculate a change of phase, and this phase change is then compared with a previous phase change to provide a measure of the change in phase change.

7. (Original) The method of claim 6, in which the signal phase change is calculated from each time window to the next successive time window, to provide a continuous monitoring of the change in phase change in that frequency band.

8. (Currently amended) The method of claim 6~~ or 7~~, in which a counter is employed, the counter being incremented if the value of the change in phase change is within a prescribed limit, the counter being reset if it is not, the measure of whether oscillation due to feedback is present in the signal being provided by the counter reaching a value M_p.

9. (Original) The method of claim 2, in which for each frequency band, for each time window the amplitude from at least one previous window is compared with that of the current window to calculate a change in amplitude.

10. (Original) The method of claim 9, in which a counter is employed, the counter being incremented if the value of the amplitude change is greater than zero, the counter being reset if it is not, the further measure of whether oscillation due to feedback is present in the signal being provided by the counter reaching a value M_a.

11. (Currently amended) The method of claim 8~~ together with the method of claim 10 insofar as dependent on claim 8~~, the counter being incremented if the value of the amplitude change is greater than zero, the counter being reset if it is not, the further measure of whether oscillation due to feedback is present in the signal being provided by the counter reaching a value M_a, and wherein M_p=M_a.

12. (Currently amended) The method of ~~any preceding~~ claim 1, in which, on determination that oscillation due to feedback is present in the signal, a selected method for suppressing oscillation is applied to the signal in that frequency band.

13. (Original) The method of claim 12 in which the suppression technique includes the step of adding a random phase to the signal in at least one of said frequency bands for a prescribed period of time.

14. (Original) The method of claim 12 in which the suppression technique is selected from the group of: applying a phase shift; applying a notch filter; subtracting a signal from the input signal; and applying a gain attenuation.

15. (Currently amended) The method of ~~any preceding~~ claim 1, for use in a system involving deriving gain values for said frequency bands in accordance with a specified signal processing algorithm, including ~~the step of~~ comparing, for some or all of said frequency bands, the derived gain with a prescribed gain limit, in order to provide a further measure as to whether oscillation due to feedback is present in the signal.

16. (Currently amended) The method of claim 15, including ~~the step of~~ comparing the derived gain with said prescribed gain limit only for frequency bands and in time windows in which said one or more defined or further defined criteria is/are met.

17. (Currently amended) The method of ~~any preceding~~ claim 1, applied to a feedback management system for a signal processing apparatus incorporating selectively adjustable or settable signal gain values, whereby the ~~steps of~~ comparing, calculating and comparing are carried out as part of a setup phase, in order to set or adjust said gain values.

18. (Original) Apparatus for identifying oscillation in a signal in a system having an input transducer and an output transducer, comprising:

means for converting the signal into the frequency domain;

means for analysing the converted signal at each of a succession of time windows over a number of frequency bands, to determine the amplitude and phase of the signal in each frequency band;

means for calculating the change in signal phase for each frequency band from a time window to a subsequent time window; and

means for comparing the change in phase with one or more defined criteria to provide a measure of whether oscillation is present in the signal.

19. (Original) The apparatus of claim 18, including means for further calculating, for some or all of said frequency bands, the change in signal amplitude from one time window to a subsequent time window, and means for comparing the result of the further calculation step to one or more further defined criteria, to provide a further measure as to whether oscillation is present in the signal.

20. (Currently amended) The apparatus of claim 18~~ or 19~~, wherein the converting means comprises a Fast Fourier Transform (FFT) unit.

21. (Currently amended) The apparatus of ~~any one of~~ claims 18~~ to 20~~, including means for comparing, for each frequency band and for each time window, the signal phase from one or more previous time windows with that from the current window to calculate a change of phase, and means for comparing this phase change with a previous phase change to provide a measure of the change in phase change.

22. (Original) The apparatus of claim 21, wherein said means for comparing is arranged to calculate the signal phase change from each time window to the next successive time window, to provide continuous monitoring of the change in phase change in that frequency band.

23. (Currently amended) The apparatus of claim 21~~ or 22~~, including a counter arranged to be incremented if the value of the change in phase change is within a prescribed limit, and to be reset if it is not, the measure of whether oscillation is present in the signal being provided by the counter reaching a value M_p.

24. (Original) The apparatus of claim 19, in which the means for further calculating comprise means for comparing, for each frequency band and for each time window, the amplitude from at least one previous window with that of the current window, to calculate a change in amplitude.

25. (Original) The apparatus of claim 24, including a counter arranged to be incremented if the value of the amplitude change is greater than zero, and to be reset if it is not, the further measure of whether oscillation is present in the signal being provided by the counter reaching a value M_a.

26. (Currently amended) The apparatus of ~~any one of~~ claims 18~~ to 25~~, in combination with a means for suppressing oscillation, the suppressing means arranged to be triggered in accordance with the measure of whether oscillation is present in the signal.

27. (Currently amended) The apparatus of ~~any one of~~ claims 18~~ to 26~~, including means for reconverting the signal to a waveform signal to be fed to the output transducer.

28. (Currently amended) The apparatus of ~~any one of~~ claims 18~~ to 27~~, in combination with a system for deriving gain values for said frequency bands in accordance with a specified signal processing algorithm, including means for comparing, for some or all of said frequency bands,

the derived gain with a prescribed gain limit, to provide a further measure as to whether oscillation due to feedback is present in the signal.

29. (Original) The apparatus of claim 28, including means for comparing the derived gain values with said prescribed gain limit only for frequency bands and in time windows in which said one or more defined or further defined criteria is/are met.

30. (Currently amended) A feedback management system for a signal processing apparatus incorporating selectively adjustable or settable signal gain values, including the apparatus of ~~any one of~~ claims 18~~ to 29~~, the system including means for setting or adjusting said gain values in accordance with a measure of whether oscillation is present in the signal.